First record of *Gonostoma elongatum* (Gonostomatidae) in the central Mediterranean Sea

by

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RÉSUMÉ. - Première capture de *Gonostoma elongatum* (Gonostomatidae) en Méditerranée centrale.

Un spécimen de *Gonostoma elongatum* Günther, 1878 (Stomiiformes, Gonostomatidae) a été capturé hors des côtes siciliennes (Italie) par chalut entre 600 et 700 m de profondeur. Ses caractéristiques morphométriques et méristiques sont décrites. C’est la première capture de ce poisson mésopélagique en Méditerranée centrale (Tyrrhénienne méridionale). La possibilité qu’il s’agisse d’un immigrant de l’Atlantique est discutée.

Key words. - Gonostomatidae - *Gonostoma elongatum* - MED - Tyrrhenian Sea - Immigrant - First record.

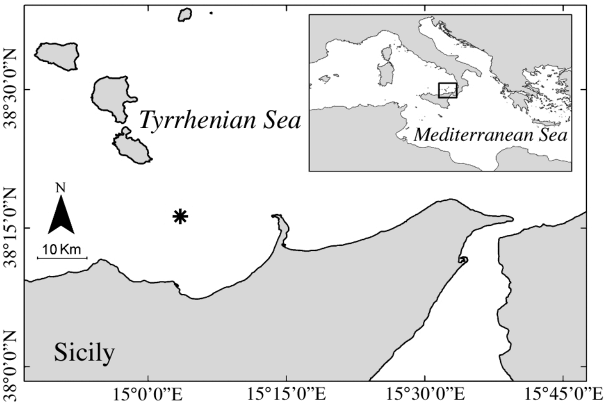

Figure 1. - Catch location (*) of *Gonostoma elongatum*.

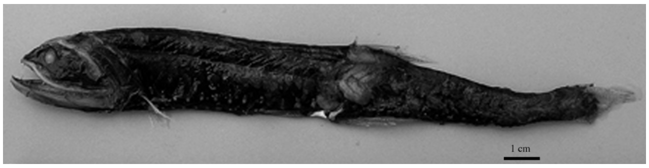

Figure 2. - *Gonostoma elongatum*, caught in the Southern Tyrrhenian Sea, 153 mm SL.

On 22 February 2006, one specimen of elongated bristlemouth fish *Gonostoma elongatum* Günther, 1878 (Stomiiformes, Gonostomatidae) was caught by a bottom trawler targeting shrimps (*Aristeus antennatus* and *Aristeomorpha foliacea*) off the Sicilian coast (Italy), in the southern Tyrrhenian Sea, between 600 and 700 m depth (from 38°15’10’’N, 15°03’20’’E to 38°16’71’’N, 15°02’98’’E) (Fig. 1). In spite of the capture method, the specimen was relatively undamaged, albeit scaleless.

The specimen was photographed with a digital camera. Measurements were made to the nearest 0.1 mm and weight to the nearest 0.01 gram (Tab. I). Morphometric and meristic characters were determined following the methods of Román *et al*. (2000) and Schaefer *et al*. (2003). The fish was then fixed in Iores I solution (Carlsbad’s salt, formaldehyde, chloral hydrate, water) for 12 hours and preserved in Iores II solution (glycerol, potassium acetate, water). Iores solutions were preferred to formalin for their better maintenance of fish colours. The specimen (code DBAEM 5646) is stored in the fish collection of the Department of Animal Biology and Marine Ecology, University of Messina.

Like other members of the Gonostomatidae family, *G. elongatum* is a mesopelagic species equipped with bioluminescent organs. It differs from the unique other Mediterranean congener *Gonostoma denudatum* Rafinesque, 1810 in having: a) numerous, not always evident, minute photophores on the body and the head, b) SO and ORB photophores surrounded by a mass of glandular tissue, c) higher tail/head+trunk ratio, d) interspace teeth in jaws not close-set, and e) 18-21 gill rakers against 15-16 in *G. denudatum* (Badcock, 1984; Schaefer *et al*., 2003). Furthermore, the two species are recognizable for the different colour of their skin observed in the absence of scales: dusky in *G. elongatum* and light in *G. denudatum* (pers. obs. after comparison of the present specimen of *G. elongatum* with three specimens of *G. denudatum* from the same haul).

All these features are detectable in our specimen and their morphometric and meristic characters correspond as well as those reported for this species in the literature (Badcock, 1984; Román *et al*., 2000) (Tab. I). It shows elongated dark body, eyes on the anterior part of head, large mouth and speckled fin rays (Fig. 2). Slight differences in some %SL values were observed comparing our data with those reported by Grey (1964) for 15 western Atlantic specimens (i.e., major predorsal and preanal lengths in our measurements); however the correspondence of all other characters demonstrates the correct identification of the species.

G. elongatum is widely distributed in tropical and subtropical waters of the Atlantic, Pacific and Indian Oceans and occurs at midwater or sometimes near-bottom depths, from 500 to 1200 m during daytime; it also shows size stratification, with increasing length of specimens in deeper waters. Like other mesopelagic species, *G. elongatum* carries out daily vertical migrations, reaching upper layers (50-400 m) at night (Badcock, 1984) to feed on crustaceans and, in minor extent, on small fishes (Clarke, 1978; Badcock, 1984; Lancraft *et al*., 1988).

G. elongatum is a protandric hermaphrodite and oviparous with planktonic eggs and larvae (Clarke, 1974; Fisher, 1983), like other

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Table I. - Morphometric and meristic data of *Gonostoma elongatum* from the southern Tyrrhenian Sea, compared with one specimen reported by Román *et al*. (2000) from the Balearic Islands. *[Données morphométriques et méristiques de* G. elongatum *capturé dans la mer Tyrrhénienne méridionale comparées à celles d'un exemplaire pêché par Román* et al. *(2000) aux îles Baléares.]*

	Present record		Román *et al*., 2000	
	mm	% SL	mm	% SL
Total length	166.00		185	
Standard length (SL)	153.00		171	
Head length	32.00	20.90	33.49	19.60
Jaw length	28.60	18.70	29.54	17.30
Eye diameter	4.20	2.70	3.80	2.20
Preorbital length (upper jaw)	5.20	3.40	6.17	3.60
Base dorsal fin	17.70	11.60	18.68	10.90
Base anal fin	59.20	38.70	64.00	37.40
Base adipose fin	4.20	2.70	6.07	3.60
Predorsal length	90.60	59.20	95.00	55.60
Prepectoral length	34.20	22.40	35.00	20.50
Preventral length	65.70	42.90	68.75	40.20
Preanal length	84.60	55.30	90.10	52.70
Preadipose length	128.60	84.10	135.95	79.50
Pectoral fin length	13.40	8.80	15.90	9.30
Pelvic fin length	14.00	9.20	14.64	8.60
Caudal peduncle depth	7.90	5.20	8.48	5.00
Body width (anus)	18.20	11.90	18.52	10.80
Weigth (g)	12.27		17.30	
Dorsal fin rays	14		14	
Anal fin rays	31		32	
Pectoral fin rays	12		12	
Ventral fin rays	8		8	
Gill-rakers	19		19	
Photophores:				
SO	1			
ORB	1		1	
OP	3		3	
BR	9		9	
IV	5 + 10		5 + 10	
VAV	6		6	
AC	21		21	
OA	13		13	

species of the family Gonostomatidae (Badcock, 1986). It reaches a maximum length of 275 mm SL (Badcock, 1984). In the Gulf of Mexico, *G. elongatum* was found to live less than two years to a maximum size of 225 mm SL (Lancraft *et al.,* 1988).

Before this record, *G. elongatum* was unknown in the central Mediterranean Sea. Unlike other mesopelagic species, this species was not recorded, in the last two centuries, among the stranded fishes in the Straits of Messina (Berdar *et al*., 1983), an area in the proximity of our catch site, well known for its very strong tidal currents that periodically bring bathyal organisms up to the surface. The only previous record of *G. elongatum* in the Mediterranean was that of Román *et al*. (2000) who reported the capture of one specimen by commercial trawling off the Balearic Islands (Spain). Therefore, may *G. elongatum* be considered an immigrant from the Atlantic Ocean in the Mediterranean? This is a viable hypothesis, supported also by the fact that neither sporadic sampling carried out in the Mediterranean with midwater gears, like Isaac-Kidd Midwater Trawl (Orsi Relini *et al*., 1994) and EZNET BIONESS (Guglielmo *et al*., 1996) nor the periodic monitoring of demersal resources by bottom trawl, from 1985 to 2006, through MEDITS or GRUND research projects, revealed catches of this species. On the other hand, it is also true that bottom trawl surveys were carried out at depths of less than 700 m at daytime, whilst *G. elongatum* occurs deeper; furthermore, since this type of trawl operates very close to the bottom, captures of species with mesopelagic behaviour are occasional. Thus, the question of whether or not *G. elongatum* is a component of the Mediterranean deep-sea fauna or an Atlantic immigrant species remains unanswered.

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REFERENCES

BADCOCK J., 1984. - Gonostomatidae. *In*: Fishes of the North-Eastern Atlantic and the Mediterranean, Vol. i (Whitehead P.J.P., Bauchot M.-L., Hureau J.-C., Nielsen J. & Tortonese E., eds), pp. 284-301. Paris: UNESCO.

BADCOCK J., 1986. - Aspects of the reproductive biology of *Gonostoma bathyphilum* (Gonostomatidae). *J. Fish Biol.,* 29: 589-604.

BERDAR A., CAVALIERE A., CAVALLARO G., GIUFFRÈ G. & POTOSCHI A., 1983. - Lo studio degli organismi spiaggiati nello Stretto di Messina negli ultimi due secoli. *Nat. Sicil*., S. IV, 7(1-4): 3-17.

CLARKE T.A., 1974. - Some aspects of the ecology of stomiatoid fishes in the Pacific Ocean near Hawaii. *Fish. Bull.,* 72: 337-351.

CLARKE T.A., 1978. - Diel feeding patterns of 16 species of mesopelagic fishes from Hawaiian waters. *Fish. Bull.,* 76: 495-513.

FISHER R.A., 1983. - Protrandric sex reversal in *Gonostoma elongatum* (Pisces: Gonostomatidae) from the Eastern Gulf of Mexico. *Copeia,* 2: 554-557.

GREY M., 1964. - Genus *Gonostoma*. *In:* Fishes of Western North Atlantic. Part 4 (Bigelow H.B., ed.), pp. 163-180. Yale Univ., New Haven, CT: Sears Foundation for Marine Research.

GUGLIELMO L., ARENA G., GRANATA A., SIDOTI O., BONAZINGA V. & SORACI F., 1996. - Distribuzione verticale e migrazione giornaliera dello zooplancton e del micronecton nel Tirreno Meridionale (Isole Eolie). *In:* Caratterizzazione ambientale marina del Sistema Eolie e dei Bacini limitrofi di Cefalù e Gioia (EOCUMM95), Data Rep. (Faranda F.M. & P. Povero, eds), pp. 217-246.

LANCRAFT T.M., HOPKINS T.L. & TORRES J.J., 1988. - Aspects of the ecology of the mesopelagic fish *Gonostoma elongatum* (Gonostomatidae: Stomiiformes) in the eastern Gulf of Mexico. *Mar. Ecol. Prog. Ser.*, 49: 27-40.

ORSI RELINI L., GARIBALDI F., PALANDRI G. & CIMA C., 1994. - La comunità mesopelagica e i predatori di "superficie". *Biol. Mar. Medit*., 1: 105-112.

ROMÁN E., ALEMANY F. & CARBONELL A., 2000. - First record of *Gonostoma elongatum* Günther, 1878 (Osteichthyes: Gonastomatidae) in the North-Western Mediterranean. *Boll. Soc. Hist. Nat. Balears*, 43: 27-31.

SCHAEFER S., JOHNSON R.K. & BADCOCK J., 2003. - Gonostomatidae. *In*: Smith's Sea Fishes (Smith M.M. & Heemstra P.C., eds), pp. 247-253. Cape Town: Struik Publishers.

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